

IN THE SPECIFICATION

Page 1, before the last paragraph, line 28, add the following:

SUMMARY OF THE INVENTION

Pages 1-2, the paragraph bridging these pages from page 1, line 28, to page 2, line 6, amend the bridging paragraph as follows:

~~Prior to reaching the present invention, the~~ The present inventors have studied the following technique as a wiring forming method of semiconductor devices using material with low dielectric constant (hereinafter, called low-k dielectric) and copper. The method will be explained in accordance with the process diagram of FIG. 2.

Page 5, line 12, delete the line in its entirety as follows: ~~SUMMARY OF THE INVENTION.~~

Pages 7-8, the paragraph bridging these pages from page 7, line 21, to page 8, line 4, amend the bridging paragraph as follows:

After the third step and before the fourth step, it is

desirable to include an etching process for removing the first insulating material layer (the dielectric barrier film) by etching by means of plasma of a mixed gas containing NF_3 and Ar through an opening patterned in the second insulating material layer ~~(the dielectric barrier film)~~ in the third step. The mixed gas plasma containing NF_3 and Ar is used to reduce a bias electric power applied to the sample. The copper as the substrate can be prevented from being etched. The polymer containing copper will not be deposited. The effect of the NF_3 gas can remove the fluorocarbon film.

Page 13, third full paragraph, lines 14-16, amend the paragraph as follows:

FIG. 2 is a process diagram showing one example of a wiring forming method studied by the inventors~~prior to the present invention;~~

Pages 18-20, the paragraph bridging these pages from page 18, line 15, to page 20, line 2, amend the bridging paragraph as follows:

The steps 14, 15 and 16 of Embodiment 1 require a plasma processing apparatus causing few foreign matters or metal

contaminants. The plasma processing apparatus therefor is shown in FIG. 4. This apparatus has a reduced pressure processing chamber 21, a sample table 23 for placing a processed sample 22, an exhaust mechanism 24 for exhaustion in the reduced pressure processing chamber 21, and a mechanism 25 for introducing gas into the reduced pressure processing chamber 21, and further is equipped with magnets 26 provided on the back surface of the sample 22 for generating a magnetic line of force in parallel with the sample surface. This apparatus has a power supply 27 for applying voltage to the sample 22. The power supply 27 intermittently applies a negative DC voltage V_0 as shown in FIG. 5 to the sample 22. There is generated plasma 28 of an etching gas introduced from the gas introduction mechanism 25 by the mutual effect of an electric field perpendicular to the sample 22 generated by the apply negative voltage and a magnet field in parallel with the sample surface generated by the magnet 26. The positive ions in the plasma 28 are radiated into the sample 22 by the negative voltage applied to the sample 22 to promote the etching reaction of the sample. During the apply OFF period of the DC voltage, the electrons in the plasma 28 are radiated into the sample 22 to neutralize charging-up of the sample 22 by the previous positive ion radiation. The charging-up

neutralizing function permits etching the insulating material such as the TEOS, SiN, SiC, and low-k film. In this apparatus, since there is no timing in which a positive voltage is applied to the sample 22, positive ions will not be accelerated and radiated into the inner wall of the reduced pressure processing chamber. For this reason, few foreign matters or metal contaminants are caused by cutting away the inner wall material of the reduced pressure processing chamber 21. In particular, when the apply OFF period Δt of the negative DC voltage to the sample 22 is shorter than 10^{-6} seconds, the ions cannot reach the inner wall of the processing chamber 21 during the apply OFF period Δt of ~~the~~ the DC voltage. The inner wall material of the processing chamber 21 will not be cut away at all by ion bombardment.